

Enterprise System/9000

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Announced September 5, 1990
and withdrawn May 24, 1998.

The following is the text of an IBM product brochure published in September 1990.

The IBM Enterprise System/9000 (ES/9000) provides the most extensive computing range ever offered processor family. Based on IBM's newest technologies and proven systems architecture, this powerful processor family provides over 100-fold growth from the smallest rack-mounted systems to top-of-the-line, general-purpose systems.

The result is a new era in computing that redefines management of the computing environment and lifts it to new levels of performance, designed to generate new and better solutions to specific business needs.

Consistent family platform

Based on IBM's Enterprise Systems Architecture/390 (ESA/390), the IBM ES/9000 family offers users a common platform across all models. This unprecedented potential for growth along clearly defined paths provides exceptional granularity in computing power.

Using state-of-the-art technology and design, the ES/9000 processors introduce the advantages of Enterprise Systems Architecture/390 in these operating system environments: VSE/ESA, VM/ESA and MVS/ESA. The powerful new processor family also extends such benefits to larger virtual storage addressing and dynamic channel subsystems -- making use of the increased central storage and channel capacities that these processors provide.

In addition, the ES/9000 family offers an array of powerful capabilities. These include vector processing, cryptography, an Enterprise Connection Channel Architecture (ESCON) implementation that includes a channel-to-channel capability, and parallel channels with 4.5MB/sec. Advanced features and functions such as these are designed to break new ground in application opportunities.

Eight water-cooled models

The IBM ES/9000 family includes eight water-cooled models: the 330, 340, 500, 580, 620, 720, 820 and 900.

Family upgrade flexibility*

As the need for added processing capability increases, upgrade paths are available from existing Enterprise System/3090 Model J and Enterprise System/3090-9000T (ES/3090-9000) models into selected water-cooled models of the ES/9000 family. And upgrade paths are available within the ES/9000 family to satisfy additional processing needs, as well.

(* Upgrades from 620 to 820 and from 720 to 900 involve substantial change to the customer's existing processor. It is the customer's responsibility to determine the tax and accounting handling of processor installations and upgrades within the customer's own organization.)

Technology and design leadership

The ES/9000 family Models 330 through 720 contain the proven technology and packaging of the Thermal Conduction Module (TCM). Models 820 and 900 use TCM packaging that has been significantly enhanced.

Additionally, design enhancements for ES/9000 Models 820 and 900 include a second-level high-speed buffer, a split first-level high-speed buffer, and improved interprocessor communication. These technological and design enhancements are key elements underpinning the heightened performance of the top-of-the-line family models.

Highlights

The water-cooled ES/9000 processor models provide these advanced functions:

Logical partitioning. The IBM Processor Resource/Systems Manager (PR/SM), a standard function on ES/9000 processors, allows systems to run concurrently in separate logical partitions (LPARs), with a high degree of isolation. In LPAR mode, up to seven logic partitions can be simultaneously active, and up to 14 in physically partitioned configurations. LPAR mode supports System/390 and System/370 architecture.

Dynamic Reconfiguration Management. This new function works together with the appropriate level of the MVS/ESA operating system to change the current system I/O configuration. Channels, control units and devices can be added or removed without the need for a system IPL -- an important contribution to increased system availability.

Integrated Vector Facility The optional Vector Facility provides a specialized execution element to process vectorized programs. Many application programs are available, encompassing a broad range of engineering and scientific solutions.

Integrated Cryptographic Feature. The new optional Cryptographic Feature is designed to strengthen your data processing installation security. This facility supports encryption, decryption, message authentication, personal authentication and key management.

Multisystem management. The ES/9000 processor family takes important steps toward key goals, such as "lights-out" operation and control of multiple system configurations.

Connection options, enhanced with the use of fiber optics, now permit communication links between data centers, as well as between a data center. In addition, a remote data center location can be powered on and off and environmentally monitored using the IBM ES/9000 System product.

Within a data center, the ESCON capability allows a systems-complex (sysplex) configuration, enabling workload balancing and sharing between systems. Multi-system configurations requiring exceptionally accurate time-of-day coordination can now use the IBM ES/9000 System to assure accuracy when timing interconnected systems operations.

Environmental changes. The ES/9000 family Models 330 to 900 come with a 50/60 Hertz (Hz) power source and a two-inch water chiller and the coolant distribution unit. These changes improve power utilization and heat transfer performance of the new models.

Improved availability. In response to user requirements for continuous operations, the ES/9000 processors provide for:

Concurrent repair of an off line central processor, while remaining central processors continue to function

Replacement of critical air-moving devices on the processor and of motors and pumps on the coolant distribution unit

Dynamic Reconfiguration Management to allow less disruptive configuration changes

Enhanced power system to provide continued system operation for most power-supply failures

Removal of the Model 3089 motor generator to eliminate a potential point of failure

IBM ES/9000 processor support units				
Model	Processor controller element	Power and coolant distrib. unit	Display stations	M
330	9022	1	2-5 (1)	1
340	9022	1	2-5 (1)	1
500	9022	1	2-5 (1)	1
580	9022	1	2-5 (1)	1
620	9022	2	3-6 (1)	2
720	9022	2	3-6 (1)	2
820	9022	2	3-6 (1)	2
900	9022	2	3-6 (1)	2
(1) 3206 Model 100				

IBM ES/9000 hardware features*	
ESA/390 Architecture	
PR/SM	
ESCON channels	
4.5MB parallel channels	

Sysplex Timer
Vector Facility
Integrated Cryptographic Feature
SIE Assist
DB2 sort enhancement
VM data spaces
Dynamic Reconfiguration Management
Enhanced power system
Console Integration
Integrated I/O features
Integrated communications subsystems
(1) Models 330, 340, 500-720
(2) Models 820, 900
* Specific software levels may be required
S = Standard feature
O = Optional feature
-- = Not applicable

IBM ES/9000 software support

IML Mode:	ESA/390	LP
VSE		
VSE/ESA V1.1	--	•
VSE/SP V4.1.2	--	•
VSE/SP V3.2.2	--	•
VM		
VM/ESA		
370 feature	--	•
ESA feature Rel 1.0	•	•
ESA feature Rel 1.1	•	•
VM/XA SP R2.1	•	•
VM/HPO R5, R6	--	•
VM/SP R5, R6	--	•
MVS		
MVS/ESA SPV4.1.0, V4.2.0	•	•
MVS/SP V3.1.Oe, V3.1.3	•	•
MVS/SP V2.2.0, V2.2.3	•	•
MVS/SP V1.3.5	--	•
AIX(under VM)		
AIX/370 V1.2	•(1)	•(2)
TPF		
TPF 3.1	•(4)	•(3)

- (1) VM/ESA only
- (2) Any supported VM level
- (3) Single system environment
- (4) 820 & 900 in physical partition mode
- 340, 500-900 in loosely coupled environment

-- = Not applicable

Note: A growing number of enabled applications are available in the areas of cooperative processing, performance monitoring, connection specific solutions and others.

IBM ES/9000 processor options

Total channels			Parallel channels			ESCON channels	
Model	Min.	Max.	Min.	Max.	Incr.	Min.	Max.
330	16	64	16	32	16	0	32
340	16	64	16	32	16	0	32
500	32	64	32	64	16	0	32
580	32	64	32	64	16	0	32
620	64	128	64	128	16*	0	64
720	64	128	64	128	16*	0	64
820	128	256	0	96	16*	32	256
900	128	256	0	96	16*	32	256

* Per side.

Processor storage (MB)			Central storage (MB)			Expanded storage (MB)	
Model	Min.	Max.	Min.	Max.	Incr.	Min.	Max.
330	32	640	32	128	32	0	512
340	32	1,152	32	128	32	0	1,024
500	64	2,304	64	256	64*	0	2,048
580	64	2,304	64	256	64*	0	2,048
620	128	4,608	128	512	64**	0	4,096
720	128	4,608	128	512	64**	0	4,096
820	256	9,216	256	1,024	128***	0	8,192
900	512	9,216	512	1,024	256~	0	8,192

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- 64 up to 128; 128 up to 256
- 64 up to 128; 128 up to 256 per side
- 128 up to 256; 256 up to 512 per side
- 64 up to 128; 128 up to 256; 256 up to 512
- 64 up to 256; 256 up to 512; 512 up to 2,096
- 256 up to 512; 512 up to 1,024; 1,024 up to 4,096 per side
- Per side

Vector Facility				Integrated Cryptographic Feature			L p
Model	Min.	Max.	Incr.	Min.	Max.	Incr.	N
330	0	1	1	0	1*	1	7
340	0	1	1	0	1*	1	7
500	0	2	1	0	1**	1	7
580	0	3	1	0	1**	1	7
620	0	4	1	0	2***	1	7
720	0	6	1	0	2***	1	7
820	0	4	1	0	2***	1	7
900	0	6	1	0	2***	1	7
*	Mutually exclusive with Vector Facility						
**	Mutually exclusive with one Vector Facility						
***	Maximum one Cryptographic Feature per side and mutually exclusive with one Vector Facility on that side.						

IBM ES/9000 upgrade performance comparison (ITR)

Model				
To	From	VM/XA SP 2.1*	MVS/ESA*	Sc
330	15T	1.2	1.2-1.6	1.
330	17T	1.0-1.1	1.1-1.2	1.
500	180J	1.8-2.0	1.9	2.
500	18T	1.8-2.0	1.9	2.
500	330	2.0-2.1	2.0-2.2	2.
500	340	1.8-2.0	1.9	2.
580	200J	1.5-1.6	1.4	1.
580	500	1.5-1.6	1.4	1.
620	200J	2.0-2.1	1.8-1.9	1.
620	280J	2.0-2.1	1.8-1.9	2.
620	28T	2.0-2.1	1.8-1.9	2.
620	500	2.0-2.1	1.8-1.9	1.
620	580	1.3	1.3	1.
720	300J	1.9	1.7-1.9	1.
720	580	1.9	1.7-1.9	1.
720	400J	1.4	1.3-1.4	1.
720	620	1.4	1.3-1.4	1.
720	500J	1.2	1.1-1.2	1.
720	600J	1.0	1.0	1.

* Performance is in Internal Throughput Rate (ITR) ratio, based on measurements and projections using IBM benchmark workloads, SP V3. 1.3 and VM/XA SP2. 1.

IBM ES/9000 physical characteristics

	330		340		500		
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Acoustics, Bels		7.8		7.8		7.8	
Power consumption, 50/60Hz, KVA	32.1	38.4	32.1	38.8	40.6	49.4	48.1
Heat output, KBTU/hr							
To water	56.0	68.9	56.0	68.9	76.1	95.9	95.6
To air	18.8	40.6	18.8	40.6	35.5	44.0	37.9
Total	74.8	109.5	74.8	109.5	111.6	139.9	133.5
Floor space							
Sq. feet	82.4	88.4	82.4	99.1	82.4	99.1	93.3
Sq. meters	7.7	8.2	7.7	9.2	7.7	9.2	8.7
Including service clearance							
Sq. feet	440.7	461.7	440.7	497.1	440.7	497.1	476.3
Sq. meters	40.9	42.9	40.9	46.2	40.9	46.2	44.3
Approximate weight							
Lbs.	10985	12780	10985	12780	11925	13710	13085
Kg	4983	5797	4983	5797	5409	6219	5935

	620		720		820		
	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Acoustics, Bels		8.1		8.1		8.1	
Power consumption, 50/60Hz, KVA	77.2	92.8	92.2	111.2	108.6	138.6	126.6
Heat output, KBTU/hr							
To water	152.2	191.8	191.2	241.0	224.6	305.2	272.4
To air	58.0	75.0	62.8	81.2	63.4	85.4	73.0
Total	210.2	266.8	254.0	322.2	288.0	390.6	345.4
Floor space							
Sq. feet	152.6	186.9	178.0	186.9	159.3	159.3	181.2
Sq. meters	14.2	17.4	16.5	17.4	14.8	14.8	16.8
Including service clearance							
Sq. feet	720.0	834.1	791.4	834.1	728.1	728.1	799.5
Sq. meters	66.9	77.5	73.5	77.5	67.6	67.6	74.3
Approximate weight							
Lbs.	22295	24625	24625	27635	23179	25203	25823
Kg	10113	11170	11170	12535	10514	11432	11455

Reference room areas

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